cause only orthinary onint'ristin' persons read litherachoor. In science wan must be ortherly. Iv'ry scientist has an ortherly brain an' becomes confused in his finer sinsibilities av a worrud has mo-ore than wan manin.' We shall have a law passed forbiddin' th' use iv anny worrud in anny but the proper meanin'.'

"'How will ye know th' proper manin'?' says I, bein' somewhat puzzled.

"'The proper manin' iv anny worrud,' says he, 'will be th' manin' which I and me brothers iv like int'rists and progrissiv ideas will give it.'

"'Who are th' villuns who have bin committin' this abuse iv will intinshuned worruds?' I asked.

"'They raly shud not be called scientists at all,' says he, 'but sudo- or false scientists. They call thimsilves "geneticists." 'Tis a worrud that means an investigator in th' sudo-science iv heredity. But whin th' law is passed,' says he, ''twill be a name iv great approbrium.'

"'I shud think the name wud be curse enuf,' said I. 'But what is the precise branch iv th' great realm iv knowlidge that they st-thrive t' be settin' in orther? What is th' rale manin' iv it?'

"'They ar' th' scounthruls,' says he bitin' a large pace out iv a pincil he was holdin', 'that ixamine yer eyes an' th' eyes iv yer wife —an' th' eyes iv yer parents barrin' they ain't iscaped be dyin'—an' tell ye what color they will let th' eyes iv yer chilther be.'

"'What av ye rafuse t' ixcipt th' color they pick out fer ye,' says I.

"'Ye have to,' says he.

"'The villuns,' says I agin, fer be this time I was beginnin' t' see th' foul plot against th' liburties iv our great nashun. 'It must be stopped.'

"'It will be,' says he. 'Ler goose a broila, as that prince iv awthirs Bill Shakespere or soome wan ilse has so will said. No more will they be allowed to fill th' chicest jernuls wid mistakes, conthradicshuns and maledicshuns concarnin' mathematics iv which they know nawthin', an' concarnin' beollergy av which they know less.'

"'But don't all conthribushuns to th' larned jernuls soometimes contain mistakes?' says I.

"'All but those iv mesilf an' a few ithers,' says he.

"'How do ye manage it?' says I.

"'We don't conthribute annythin',' says he.

"'Have ye spoken to me frind Doc Wiley about this attack upon th' bulworruks iv a great people?' says I.

"'I have written him th' full details,' says he, 'but I'm afraid he has proved false to th' thrust th' people have reposed within him.'

"'What did he say?' I ixclaimed in horror.

"'Here is his letther,' says he.

"'My Dear Sir: I fear yer liver is out iv orther. I wud advise you to take Hg_2Cl_2 wantinth grain iv'ry fifteen minits fer four hours. N. B. Be sure an' rimimber the 2 afther the Hg, fer anny misuse iv sich a worrud or characther might cause wan iv yer inimies t' be indited fer yer desace.'"

"'Wud he pisen ye?' says I.

"'I don't know,' says he, 'I didn't take it.'"

"I'm not sure that I know what it's all about," said Mr. Hennessy, "but it must be a grand thing t' be a raly great scientist. I shud like to be wan."

"Fergit it," said Mr. Dooley, "th' great wans ar' all dead."

A. P. SEUDO,
With apologies to P. F. Dunne

SCIENTIFIC BOOKS

RECENT BOOKS ON THE DOCTRINE OF DESCENT

La genèse des espèces animales. By L. CUÉNOT. Paris, Felix Alcan. 1911.

Allgemeine Vererbungslehre. By V. HAECKER. Braunschweig, Friedr. Vieweg und Sohn. 1911.

Heredity in Relation to Evolution and Animal Breeding. By WILLIAM E. CASTLE. New York, D. Appleton & Co. 1911.

Upon the Inheritance of Acquired Characters. By E. RIGNANO. Authorized English translation by BASIL C. H. HARVEY. Chicago, Open Court Publishing Co. 1911.

These four books have one feature in common, namely, they all deal with problems

which lie at the base of the doctrine of descent. But while they present this similarity they also differ greatly in their scope and manner of presentation, the first covering the broader field of the origin and adaptation of species, the second reviewing carefully and thoroughly our present position with regard to the fundamental facts and theories of heredity, the third presenting in a more popular manner the principles of Mendelian inheritance, while the last is an exposition of a new theory of heredity.

Professor Cuénot's book is one of the International Scientific Series, and in many ways it recalls one of the same series published thirty years ago and still a treasury of pertinent facts for the modern zoologist, Semper's "Animal Life." It endeavors to present impartially the important facts upon which the conclusions of zoological investigation are founded, rather than a minute exposition or criticism of these conclusions. The first part is a brief statement of the growth of the doctrine of transformism and to this succeeds a study of the phenomena of reproduction, form regulation and correlation, animal behavior and sex differentiation, and finally, the duration of life of the individual is considered.

The third part is devoted to the conditions under which variation of the individual occurs, under which heading are considered the phenomena of mutation (the Mendelian phenomena being included under that caption), the non-inheritance of acquired characters and selection, and then follows a fourth part devoted to geographical distribution and the faunistic characteristics of the various milieux, marine, aquatic and terrestrial. In this part one finds brief, interesting discussions of the planktonic, littoral and bathysinal faunas, together with those of brackish and supersaline waters, mountain regions and caves and, finally, there is a brief discussion of commensalism and parasitism. The fifth and last part presents, first, a brief statement of the doctrine of panspermia maintained by Montlivault and Arrhenius, and proceeds with a discussion of the origin of species and adaptations in which such phenomena as isolation, parallelism, polymorphism, regression, protective and warning coloration and mimicry are illustrated by well-chosen examples. A brief exposition of the views of Lamarck, Darwin, Eimer, Weismann and the post-Darwinian schools rounds out a satisfactory concrete exposition of what may be termed the principles of general zoology. Notwithstanding the conciseness necessary in a work covering so wide a territory the book is most readable and interesting, and, with its extraordinary wealth of well-chosen examples and its abundant illustrations, will prove a boon both to the teacher and the student of general zoology.

Haecker's "Allgemeine Vererbungslehre" has more of an academic character, being the outcome of lectures delivered by the author in past years at Stuttgart, Hohenheim and Halle, and will be welcomed by professional zoologists as a thorough scientific exposition of our present knowledge of the underlying principles and laws of inheritance. Starting with a brief historical section, in which Galton's law is discussed, the morphological bases of heredity are considered with a thoroughness and clearness that are admirable, the author's experience with cytological phenomena as seen in copepodan germ cells rendering him especially at home in this part of his subject. Of especial interest are the discussions of heterotypic mitoses and heterochromosomes and of the significance of the number of chromosomes. The third section is of a more theoretical nature, being devoted to a review of Weismann's hypotheses and Hertwig's theory of biogenesis.

The fourth section is a return to the descriptive side of the subject, the phenomena of Mendelian inheritance being under consideration, and receiving a remarkably clear presentation, excellently illustrated. In the concluding section theoretical considerations, such as the individuality of the chromosomes, the reduction division and the determination of sex are again prominent, and the last chapter is devoted to the discussion of a Kernplasma theory of heredity to replace the chromosome theory.

Haecker's book by reason of its thoroughness and scientific method of exposition will undoubtedly be to a large extent caviare to the general, but that by Castle will appeal to a much wider circle of readers as a clear and direct statement of the Mendelian principles and their application, couched in language as simple and untechnical as may be. Its title, compared with that selected by Haecker, is perhaps a little misleading, for the book is limited to an account of the Mendelian phenomena and their formal explanation. The cytological side of inheritance, so prominent in Haecker's book, is barely considered; indeed, it could hardly be expected in a book written for the general reading public. Taking into account the limitations set by its purpose, the book is an excellent presentation of the Mendelian phenomena, based upon studies extending over some ten years, and while the general reader may in some cases find it difficult to follow the complexities of the phenomena, yet he will not fail to form an intelligent appreciation of the far-reaching significance of Mendelism.

But it is not to the lay brother alone that the book will prove of interest. The expert will find much to interest him in its logical methods and in the *résumé* it presents of extensive experience in experimental breeding, and in certain of the chapters, such, for instance, as those on Mendelism and Selection and on Heredity and Sex, he will be rewarded with no scanty supply of food for thought.

Rigano's work appeared in a French edition as long ago as 1907 and an abstract of it by the present translator was published in *The Monist* in 1909. It is an attempt to formulate a new theory of heredity based on analogy with certain electrical phenomena. The theory of centro-epigenesis, as it is named, assumes the existence in the germ plasma of certain specific potential elements, which send out in succession through the organism impulses which determine the various stages of its ontogeny, each specific impulse depositing in the nucleus of the cells to which it passes a definite substance, which, under similar conditions is again capable of producing the same specific impulse as that by which it was deposited. When ontogenesis is complete the organism is in a state of dynamic equilibrium so far as the epigenetic impulses from the germ plasm are concerned, but it is now receiving functional stimuli, which in a similar manner produce specific impulses leading to the deposit of what may be a new kind of material. If the stimulus reaches the germ plasm new specific potential elements will be deposited in it and so the way is open for the inheritance of acquired characters.

This is a bald statement of the essentials of the theory which is fully elaborated and compared with rival theories in the volume under consideration. Similarities with Semon's theory of mnemes suggest themselves, and like this the theory can truthfully be said to be exceedingly suggestive. But if criticism may be made without entering into details, it would seem that centroepigenesis explains almost too much, in furnishing possibilities for the inheritance of acquired characters far beyond what reality demands. It is based on assumptions which at present we have no means of either proving or, what is much more difficult, disproving, assumptions drawn from what is not always a reliable source, namely from analogy. But right or wrong, it should serve to suggest lines along which the further investigation of the physiology and physics of the developing organism may advantageously proceed.

The translation, it should be stated, is well done and the translator is to be congratulated on having supplied English readers with an accurate and readable statement of the theory.

J. P. McM.

Nephritis, An Experimental and Critical Study of its Nature, Cause and the Principles of its Relief. By Dr. Martin H. Fischer. (The 1911 Cartwright Prize Essay of the Association of the Alumni of the College of Physicians and Surgeons, Medical Department of Columbia University, New York.) First edition, large 12mo. Pp. ix + 203;

31 figures, including a colored plate. Cloth, $2.50 net. New York, John Wiley & Sons. 1912.

In this book Fischer has made a special application to the kidney of the same standpoint, principles and methods as were used in the more general discussion contained in his work on edema, published two years ago. According to his view it is to the colloidal properties of albuminous substances, and particularly of such bodies in the jel state, that we must look for an explanation of many phases of the behavior of living cells, not only in health, but to an equal degree in disease. In particular the amount of water contained within every cell, *i. e.*, its turgescence, and the extent to which the cell membrane dissolves, passing from the jel to the sol condition in the surrounding fluids, are determined by the properties peculiar to colloids. These properties, as we find them in the so-called emulsion or lyophilic colloids to which all albuminous substances belong, include a specific avidity for water according to the conditions under which the colloid is placed. Thus if a piece of dry sheet gelatin is placed in water at an ordinary temperature it swells—that is, imbibes water—to a fairly definite degree. Similarly in the sol condition, as in the case of the proteins of the blood plasma, the water in which they are said to be "dissolved" is really held by the colloid. Otherwise the tissues of the body should immediately imbibe all of the blood fluid as they do saline or Ringer's solution. The avidity of the colloids for water is, however, subject to great alterations according to the surrounding conditions. Thus acids and alkalies both induce a markedly increased degree of swelling as compared with a neutral watery medium, while salts, on the contrary, tend to decrease the capacity of colloids to take up and hold water. As the result, in particular, of the work of L. J. Henderson it is now known that the normal blood is not only neutral in reaction, but that it has a remarkable capacity to maintain its neutrality against the introduction of considerable quantities of acids or alkalies. Under the influence of toxic substances, or under conditions in which the circulation is interfered with, a formation and accumulation of acids within the tissues of an organ does, however, occur. This is particularly the case in an organ which, like the kidney, has normally a large respiratory exchange.

Boldly following this conception to its conclusion Fischer holds that "all the changes that characterize nephritis are due to a common cause—the abnormal production or accumulation of acid in the cells of the kidney. To the action of this acid on the colloidal structures that make up the kidney are due the albuminuria, the specific morphological changes noted in the kidneys, the associated production of casts, the quantitative variations in the amount of urine secreted, the quantitative variations in the amounts of dissolved substances secreted, etc." In support of this thesis experiments are reported in which a typical cloudy swelling was induced in thin sections of fresh kidney tissue when placed in dilute acid. Similarly in experiments upon animals injection of acid into the blood stream is quickly followed by a marked albuminuria. The same result follows temporary ligation of the renal blood vessels. On the other hand—and herein, perhaps, lies the most important points of Fischer's investigations—if under conditions in which nephritis would otherwise occur an increased quantity of neutral salts is brought into contact with the tissues, the effects of acid may be completely counteracted, and the kidney restored to practically normal structural appearance and functional behavior. Thus, "Sodium chloride when injected intravenously, in concentrated solution, simultaneously with hydrochloric acid solution of a concentration which we found in other experiments to lead to the symptoms of a most intense acute nephritis, practically suppresses this entirely. The albuminuria scarcely appears, and there are no casts, no red blood corpuscles, no homoglobinuria, no decrease in the amount of urinary secretion, and no general edema." Finally Fischer reports a number of clinical cases of nephritis, some of them with complete anuria and coma, in which a rapid recovery was in-

duced by the administration per rectum of a solution of $NaCO_3$ and NaCl.

From the foregoing outline it will be seen that this book is in no sense the conventional restatement of pre-existing data and current opinions. On the contrary, it is a highly original thesis. From those hide-bound critics, who resent whatever is unorthodox, it will probably elicit more dissent than approval. This has always been the price exacted by such critics from those who are ahead of their time. They objected to Fischer's preceding work on "Edema" on the ground that "there are some facts which it fails to explain." They will find that the same criticism can be made of the present monograph. There are indeed some points in the book upon which one must hope that the author will later bring forward fuller evidence. Nevertheless, if, as seems but fair, a new idea is rather to be approved for the points which it illumines than condemned for those which it leaves in obscurity, this work should be welcomed and studied. It holds out suggestions which may prove of great practical therapeutic usefulness. On the theoretic side there is a wide range of phenomena, previously obscure, upon which it throws a brilliant light.

Yandell Henderson

An Experimental Study of the Death-Feigning of Belostoma (=Zaitha Aucct.) flumineum Say and Nepa apiculata Uhler. By Henry H. P. Severin, Ph.D., Professor of Entomology, College of Hawaii, and Harry C. Severin, M.A., Professor of Entomology, South Dakota State College of Agriculture and Mechanic Arts. Cambridge, Boston, Mass., Henry Holt and Company. 1911. Pp. iii + 47, with one plate.

This excellent piece of experimental work forms one of the series of "Behavior Monographs," that are being published in connection with *The Journal of Animal Behavior*, being Number 3, Serial Number 3, Volume I.

There is, perhaps, no more curious and interesting form of instinctive response than that represented by the death-feigning reaction among insects. It has been a matter of considerable discussion among students of animal activities for many years. There has been no piece of work of this nature published for some time which so thoroughly treats of this peculiar form of behavior, by the experimental method—unless we consider that of Holmes on *Ranatra*.

The major headings of the table of contents will largely indicate the nature of the monograph: I., Introduction; II., General Characteristics of the Death-Feint; III., Duration of Successive Death-Feints; IV., The Effect of Dryness and Moisture on the Duration of the Death-Feint; V., The Effect of Temperature on the Duration of the Death-Feint; VI., The Effect of Light on the Duration of the Death-Feint; VII., The Effect of Mutilation on the Death-Feint; VIII., The Origin and Development of the Death-Feint; IX., The Psychic Aspect of the Death-Feint; X., Summary.

II. It is shown that the "death-feigning" postures of *Belostoma* are decidedly characteristic. However, the positions assumed during the feint are unlike those of the dead insect. The response may be elicited by simple contact; as, for instance, when it is dipped out of the water with the net; or when it is picked out of the aquarium by hand. Some individuals do not feign death readily; in such cases, repeated touching of the posterior part of the abdomen will cause the organism to respond with the death-feigning reaction. *Nepa* feigns death either in the water or out of it. Here again contact seems to be the important stimulus. *Nepa* will even feign death when feeding, the creature "keeping the styliform mandibles and maxillæ sunk into the prey." Detailed descriptions are given of the positions of the various appendages during the feint, both in the case of *Belostoma* and *Nepa*. While the former assumes a characteristic posture, *Nepa* will feign death with the appendages in the same position as taken just previous to the death-feint. During the feigning period, the muscles of *Belostoma* are in a condition of "extreme tetanus." *Nepa*

may be held by any tibia or femur in such a manner that the weight of the entire insect is sustained by the extensor muscles of an individual segment of one leg. In the case of *Nepa* many interesting details are given concerning preliminary movements immediately prior to the termination of the feint. If *Belostoma* is mutilated by snipping off small portions of the appendages, the animal quickly comes out of the death-feint after one or two repetitions of the excision. *Nepa* acts quite differently. The legs may be cut off one at a time, and even the tip of the abdomen, without any movement on the part of the organism.

III. It was found that the duration of the feint varies considerably in different individuals. One group of Belostomas were put into thirty-eight death-feints; after this they refused to respond. After having been placed in water for a few moments, they again displayed the reaction. This was repeated again and again until the insects no longer feigned death. "The average time that all of the Belostomas feigned throughout all the series of successive death feints was eight hours." In other experiments, it was found that the responses, in both *Belostoma* and *Nepa,* became weaker toward the end of the series; also that the duration of the death-feint decreased in a succession of trials; and that the cause of the cessation of the response, in each series of experiments, while partly due to fatigue, was more largely the result of the dryness of the body while exposed to the air.

IV. Dryness tends to decrease and dampness to increase the length of the death-feint. If *Belostoma* is placed upon the surface-film, or below the water surface, the duration of the feint is diminished. When *Belostoma* is thrown into the water, it usually comes out of the death-feint immediately. Sometimes, however, the creature will bob up to the surface of the water and feign in that position.

V. The duration of the death-feint diminishes in both species when exposed to high temperatures. At a low temperature the response is lessened in *Belostoma.* In *Nepa,* on the other hand, a low temperature prolongs the death-feint. These facts were ascertained while the insects were exposed to the atmosphere. Experiments were also undertaken with the view to discover what the result would be on the death-feigning reaction when the animals were transferred from water to the atmosphere. It was found that the duration of the feint is lessened when the transition was from water at a low temperature to the atmosphere with a temperature lower than 12° C. In both *Belostoma* and *Nepa* the death-feint considerably decreases at a low temperature.

VI. If Belostomas are exposed to sunlight the length of the death-feigning reaction diminishes. In certain experiments with artificial light it was discovered that both *Belostoma* and *Nepa* are aroused more quickly when subjected to a bright light than was the case with a weak light. A moving light arouses both species sooner than a stationary one. The death-feint in *Nepa* is much diminished when the creature is exposed to a bright light, if the organisms had previously been kept in the dark.

VII. The authors call attention to the work of Robertson on spiders, *Epeira producta?* and *Amaurobius* sp.? This author found that the "sham-death" reflex may be induced in the above active species "by the thoracic ganglia alone, or even by the ganglia of the posterior or two anterior segments of the thorax alone. . . . With the supra- and sub-œsophageal ganglia removed the reaction is still carried out in the active species, but it is now weaker, has a longer latent period (in *Epeira* sp. at least, and probably in *Amaurobius* sp.) and it is a rhythmically interrupted tetanus." In this same connection the work of Holmes on *Ranatra* is quoted. If the head of *Belostoma* is removed with a pair of sharp scissors, the creature generally continues to feign death. Decapitated specimens will often swim freely in the water after arousing from the feint. On removing the supra-œsophageal ganglion most of the organisms continued the death-feint; but the usual tension of the body and

appendages was very much weakened. "With those decapitated Belostomas that assumed the death-feigning attitude, a weakened tetanic condition of the muscles could be induced by gently stroking the abdomen with a camel's hair brush, but the instant the stroking ended the legs would sprawl apart and become lax." Certain experiments were performed by the authors in which the Belostomas and Nepas were cut into two distinct parts, the cut being made between the prothorax and the mesothorax. The operation was performed in such a manner that "neither the fused infra-œsophageal and first thoracic ganglia, nor the large ganglion, which innervates the posterior pairs of legs and the abdomen, are injured." In such cases, in *Belostoma,* the two parts continued to feign death. In fact the response continued for a considerable length of time after the operation. The posterior portion, after coming out of the death-feint, if thrown into water, would attempt to swim by making a few feeble movements with the appendages. When the water bug, *Belostoma,* is severed between the first two thoracic segments, the two portions will continue the feigning posture; yet when the head is removed, the organism immediately arouses from the death-feint. In other cases the insect (*Nepa*) was severed across the metathorax, posterior to the last ganglion, and it was found that the posterior portion did not respond to stimuli at all even when the ventral surface of the abdomen was touched with a red hot needle; but the part in front of the cut reacted much in the same manner as an uninjured specimen.

VIII. In the discussion of "The Origin and Development of the Death-Feint," the authors review the ideas of Preyer, Romanes and Holmes. They call attention to the fact that both *Belostoma* and *Nepa* tend to cling together and form clusters, a positively thigmotactic response. It is also a noticeable phenomenon that contact stimuli play a large rôle in the lives of both of these organisms. "The various members of the families Belostomidæ and Nepidæ" are largely responsive to touch stimuli. The authors believe that the phenomenon of death-feigning may have its origin "out of positively thigmotactic propensities."

IX. The authors do not believe that in the lower animals there is any conscious effort to deceive their enemies through the death-feigning response. They consider that the act is an instinctive one. There is no room for the supposition that the response is anything more than a non-intelligent one. "The death-feint in the arthropods is simply a non-intelligent instinctive act."

C. F. Curtis Riley

Urbana, Ill.,
November 14, 1911

The Sun. By Charles G. Abbot. D. Appleton & Co. 1911. Pp. xxv + 448, illustrated.

Upon the steady and regular maintenance of the amount of heat received by the earth from the sun depends the very existence of life upon our planet. Any large variation in the amount of solar heat would totally destroy the world as it is to-day, would make it an uninhabitable furnace or a frozen waste of icebergs. This dependence upon the life-giving properties of the sun has been dimly realized from the earliest times; in many lands and in many ages the sun has been worshipped as the all-powerful, the god of gods. Yet it is only within comparatively recent years that anything has been known as to what the sun really is, and whence is derived its constant outpourings of light- and life-giving energy. A hundred years ago, so little was known about heat and its properties that the elder Herschel could advance his fanciful and utterly impossible theory of a habitable sun.

To within the last three or four years widely divergent views have been held as to how much heat (radiant energy) reaches the earth from the sun in a given time. The younger Herschel in 1838 made the first scientific estimate of the quantity of heat derived from the sun. He found that a beam of sunlight three inches in diameter would raise the temperature of half a pint of water 0.37 of a degree per minute, or, were the sun in the zenith, the amount of heat received would

melt a coating of ice one inch in thickness in two hours and a quarter. Langley, about 1880 devised the "bolometer," an electrical thermometer so delicate that differences of temperature of less than one hundred-millionth of a degree can be detected. This instrument, as perfected and used by Langley and Abbot, has revolutionized the methods of studying the character and amount of heat received from the sun. The latest researches of Abbot and the Smithsonian Institution show that if the sun's rays could be completely employed to melt ice they would suffice to melt a coating one inch thick in one hour and thirty-eight minutes, or a layer 426 feet thick in a year.

Abbot's book is a study of the latest researches on the light and heat of the sun, of the sources from which that body derives its apparently inexhaustible supply of energy, and of the methods and instruments by means of which the great advances in knowledge have been made. It is a book by an active and successful worker in the field of solar investigation, a particularly sane and successful worker. The simple astronomical facts regarding the size, shape and distance of the sun, the phenomena of the visible surface, the rotation and the spots, are reviewed at length, but the feature of the book is the exhaustive treatment of all questions connected with the sun's action as a fountain of light and heat.

As to what the sun really is, Abbot is a strong advocate of the theory of a purely gaseous body (except sun spots). That the sun is mainly gaseous has been the accepted theory, but most writers and investigators have considered the visible surface as semi-fluid, as a sort of cloudlike formation floating in the outer gaseous envelopes. Sunspots are regarded by Abbot as cyclonic storms, or vortices, similar in form to water spouts seen at sea, the whirl carrying gases from below upward. The rapid uprush of the gases and the spreading out into the trumpet shape top, cause a rapid expansion and great cooling. This cooling carries the temperature down, and allows the formation of liquids, and thus the spots may be cloudlike forms, with some liquid and even solid particles. The peculiar periodicity of the spots in number and size is as yet unexplained. As to the source of the sun's heat and energy, Abbot shows that we may still regard Helmholtz's contractive hypothesis as adequate to satisfy the requirements of geology and physics. He is not carried off his feet by the popular scientific craze of explaining everything as a phase of radio-activity. Radio-active processes may have contributed somewhat to the store of solar energy, but that they have been any appreciable factor has not yet been shown.

The book is well written and is full of interesting matter for the scientist and for the general student. In it are tabulated and brought together the results of many researches, some hitherto unpublished, and others only to be found in special journals; the various hypotheses of solar physics are clearly set forth, and the merits and defects of each explained. It is the best work on the subject that has appeared for many years and will rank with and take the place of the similar book, by the late Charles A. Young, which for so many years was regarded as the standard treatise on "The Sun."

CHARLES LANE POOR
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SCIENTIFIC JOURNALS AND ARTICLES

THE March issue of *Terrestrial Magnetism and Atmospheric Electricity* contains the following articles:

"Ueber den elektrischen Strom Erde-Luft und seinen Zusammenhang mit den Erdströmen und den Schwankungen des erdmagnetischen Feldes," A. Gockel.

"Results of Magnetic Observations made by the United States Coast and Geodetic Survey at the Time of the Solar Eclipse of April 28, 1911," O. H. Tittmann.

"Magnetic Declinations and Chart Corrections in the Indian Ocean Continued," L. A. Bauer and W. J. Peters.

"Die Verteilung der Leitfähigkeit der Atmosphäre über dem grossen Ocean nach den Beobachtungen der *Galilee*," A. Nippoldt.

"Determination of the Pole Distance of a very Small Magnet" (abstract), J. M. Miller.